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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/692,024

10/23/2003

Ralf Staub

INF 2003-US/PC

8527

7590

02/03/2005

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EXAMINER

ESTRADA, MICHELLE

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 02/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/692,024

Applicant(s)

STAUB ET AL.

Examiner

Michelle Estrada

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) 1-10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 10/23/03.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II (claims 11-22) in the reply filed on 11/22/04 is acknowledged. The traversal is on the ground(s) that the Examiner has not provided any substantive analysis with respect to the criteria listed in MPEP § 803.

Below is an analysis as requested by the Applicant.

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions, which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-10, drawn to a process of making a semiconductor device classified in class 438, subclass 243.

Group II, claim(s) 11-22, drawn to a semiconductor device classified in class 257, subclass 301.

The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the device as claimed can be made by a different process such as one that does not comprise forming a liner layer on at least the exposed portion of the source/drain electrode.

Applicant is advised that the reply to this requirement to be complete must include an election of the invention to be examined even though the requirement be traversed (37 CFR 1.143).

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Claim Objections

Claim 16 is objected to because of the following informalities: in line 2, it appears that --that-- should be inserted after "contacts". Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-15, 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Lu (6,218,693).

Re claim 11, Lu discloses a trench capacitor (32/34); and a select transistor (14/16/18), comprising: a diffusion region forming a source/drain (17/19) electrode of the select transistor (Col. 3, lines 30-62); a bit line contact (30') formed in an insulator layer (20) and comprising a filling comprising a metal alloy (Col. 2, lines 34-41), wherein the bit line contact connects the source/drain region to an associated bit line (30) (See Fig. 4); and a doped region (19) between the substrate and the filling of the bit-line contact.

Re claim 12, Lu discloses wherein the doped region (19) is formed on the source/drain region (17) (Col. 2, lines 12-14).

Re claim 13, Lu discloses wherein the doped region comprises a locally limited electrically conductive contact layer, having a relatively reduced lateral migration underneath the insulator layer.

Re claim 14, Lu discloses wherein the select transistor (14/16/18) is at least partially disposed in the substrate and the trench capacitor is completely disposed in the semiconductor substrate (10) (See Fig. 4).

Re claim 15, Lu discloses wherein the bit-line contact comprises at least one or tungsten, aluminum and copper (Col. 2, lines 34-41).

Re claim 17, Lu discloses wherein the bit-line contact further comprises a liner (barrier) layer formed between the substrate and the filling of the bit-line contact (Col. 2, lines 34-41).

Re claim 18, Lu discloses wherein the liner layer comprises Ti/TiN (Col. 2, lines 34-41).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lu as applied to claims 1-15, 17 and 18 above, and further in view of Dennison et al. (6,429,069).

Lu does not disclose wherein the memory cell is part of a memory cell arrangement comprising peripheral contacts that are formed in a same structure plane and comprising a filling substantially similar to that of the bit-line contact.

Dennison et al. disclose a memory cell arrangement comprising peripheral contacts (50/54/56) that are formed in a same structure plane and comprising a filling

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substantially similar to that of the bit-line contact (48) (Col. 6, line 66-Col. 7, line 1 and Fig. 4B).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Lu and Dennison et al. to enable the peripheral contacts formation step of Dennison et al. to be performed in the process of Lu because by making the peripheral contacts and the bit-line contact on the same structure plane and of the similar material, all of them can be made in a single step saving process steps, time and manufacturing costs.

Claims 19-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu as applied to claims 1-15, 17 and 18 above, and further in view of Bollinger et al. (6,762,136).

Re claim 19, Lu does not disclose an annealed region formed as a result of an anneal process performed during fabrication of the bit-line contact.

Bollinger et al. disclose an annealed region formed in the silicon substrate after implantation of the doping material (Col. 2, lines 10-14).

It would have been within the scope of one of ordinary skill in the art to combine the teachings of Lu and Bollinger et al. to enable the annealed region formation step of Bollinger et al. to be performed in the process of Lu because the annealing will repair the crystal damage done by the implant process in the bit-line contact (Col. 2, lines 13-14).

Re claim 20, Bollinger et al. discloses wherein the annealed region includes a damage region damaged during a doping process performed to form the doped region (Col. 2, lines 10-15).

Re claim 21, Bollinger et al. disclose wherein the annealed region includes at least a portion of the doped region (Col. 2, lines 10-15).

Re claim 22, Lu discloses wherein the bit-line contact further comprises a liner (barrier) layer formed between the substrate and the filling of the bit-line contact (Col. 2, lines 34-41).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michelle Estrada whose telephone number is 571-272-1858. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-0224 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 571-272-2800.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

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published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



MEstrada
February 1, 2005



George Fourson
Primary Examiner
Art Unit 2823